

What is claimed is:

- 1 1. A method of manufacturing an imaging component
2 comprising:
3 placing a focusing device in between a laser generator and a
4 scintillator element, said scintillator element comprised of a substantially
5 isotropic portion;
6 generating a laser using said laser generator;
7 focusing said laser using said focusing device such that a focal
8 spot of the laser is coincident with a portion of said isotropic portion;
9 using said laser to alter the optical properties at said focal spot
10 such that anisotropy is generated in said isotropic portion; and
11 moving said focal spot relative to said scintillator element such
12 that a three-dimensional pattern with altered optical properties is generated, said
13 three-dimensional pattern controlling the spread of photons within said
14 scintillator element.
- 1 2. A method of manufacturing an imaging component as in
2 claim 1 wherein said scintillator element comprises a single crystal element.
3
- 1 3. A method of manufacturing an imaging component as in
2 claim 1 wherein said scintillator element comprises a glass element.
- 1 4. A method of manufacturing an imaging component as in
2 claim 1 wherein said scintillator element comprises a ceramic element.
- 1 5. A method of manufacturing an imaging component as in
2 claim 1 further comprising:
3 integrating said scintillator element into a computed tomography
4 assembly.
- 1 6. A method of manufacturing an imaging component as in
2 claim 1 further comprising:

3 integrating said scintillator element into an x-ray imaging
4 assembly.

1 7. A method of manufacturing an imaging component as in
2 claim 1 further comprising:

3 integrating said scintillator element into a positrons emissions
4 tomography assembly.

1 8. A method of manufacturing an imaging component as in
2 claim 1 wherein said laser generator comprises a picosecond pulse laser.

1 9. A method of manufacturing an imaging component as in
2 claim 1 wherein said laser generator comprises a femtosecond pulse laser.

1 10. A method of manufacturing an imaging component as in
2 claim 1 wherein said laser generator comprises a titanium sapphire laser.

1 11. A method of manufacturing an imaging component as in
2 claim 10 wherein said titanium sapphire laser is regeneratively amplified.

1 12. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 changing the crystal structure within a crystalline scintillator
4 element.

1 13. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 creating localized crystal domains of different orientation that the
4 surrounding crystalline material in a crystalline element.

1 14. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 creating localized crystalline regions within a non-crystalline
4 element.

1 15. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 creating localized non-crystalline regions within a crystalline
4 element.

1 16. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 generating micro-voids within the scintillator element.

1 17. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 changing index of refraction at said focal spot.

1 18. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 changing optical absorption at said focal spot.

1 19. A method of manufacturing an imaging component as in
2 claim 1 wherein said altering the optical properties comprises:
3 changing photon scattering properties at said focal spot.

1 20. A method of manufacturing an imaging component as in
2 claim 1 wherein said three-dimensional pattern comprises:
3 a plurality of first planes formed across said scintillator element;
4 and
5 a plurality of second planes formed across said scintillator
6 element, said plurality of second planes intersecting said plurality of first planes
7 to form a plurality of scintillator cells.

1 21. A method of manufacturing an anisotropic scintillator for
2 use in an imaging system comprising:
3 placing a scintillator element in communication with a focusing
4 device and a pulse laser generator;

5 generating a pulse laser using said pulse laser generator;
6 focusing said pulse laser using said focusing device such that a
7 focal spot of said pulse laser is coincident with a portion of said scintillator
8 element;
9 using said pulse laser to alter the optical properties at said focal
10 spot such that anisotropy is generated in said scintillator element; and
11 moving said focal spot relative to said scintillator element such
12 that a three-dimensional pattern with altered optical properties is generated, said
13 three-dimensional pattern controlling the spread of photons within said
14 scintillator element.

1 22. A method of manufacturing an anisotropic scintillator for
2 use in an imaging system as described in claim 21, wherein said using a pulse
3 laser to alter optical properties comprises:
4 generating micro-voids within the scintillator element.

1 23. A method of manufacturing an anisotropic scintillator for
2 use in an imaging system as described in claim 21, wherein said using a pulse
3 laser to alter optical properties comprises:
4 changing index of refraction at said focal spot.

1 24. A method of manufacturing an anisotropic scintillator for
2 use in an imaging system as described in claim 21, wherein said using a pulse
3 laser to alter optical properties comprises:
4 changing optical absorption at said focal spot.

1 25. A method of manufacturing an anisotropic scintillator for
2 use in an imaging system as described in claim 21, wherein said using a pulse
3 laser to alter optical properties comprises:
4 changing photon scattering properties at said focal spot.

1 26. An anisotropic scintillator for use in an imaging system
2 comprising:

3 a scintillator element comprised of a scintillator material having
4 a first optical property;
5 a three-dimensional pattern formed in said scintillator element
6 utilizing a pulse laser, said pulse laser altering said first optical property at a
7 plurality of locations within said scintillator element such that said three-
8 dimensional pattern is comprised of a second optical property;
9 wherein said three-dimensional pattern controls the spread of
10 photons within said scintillator element.

1 27. An anisotropic scintillator for use in an imaging system
2 as described in claim 26, wherein said three-dimensional pattern comprises:
3 a plurality of first parallel planes formed across said scintillator
4 element; and
5 a plurality of second parallel planes formed across said
6 scintillator element perpendicular to said plurality of first parallel planes, said
7 plurality of second parallel planes intersecting said plurality of first parallel
8 planes to form a plurality of scintillator cells.

1 28. An anisotropic scintillator for use in an imaging system
2 as described in claim 26, wherein said scintillator element comprises a single
3 crystal element.

1 29. An anisotropic scintillator for use in an imaging system
2 as described in claim 26, wherein said scintillator element comprises a ceramic
3 element.